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Fig. 1.

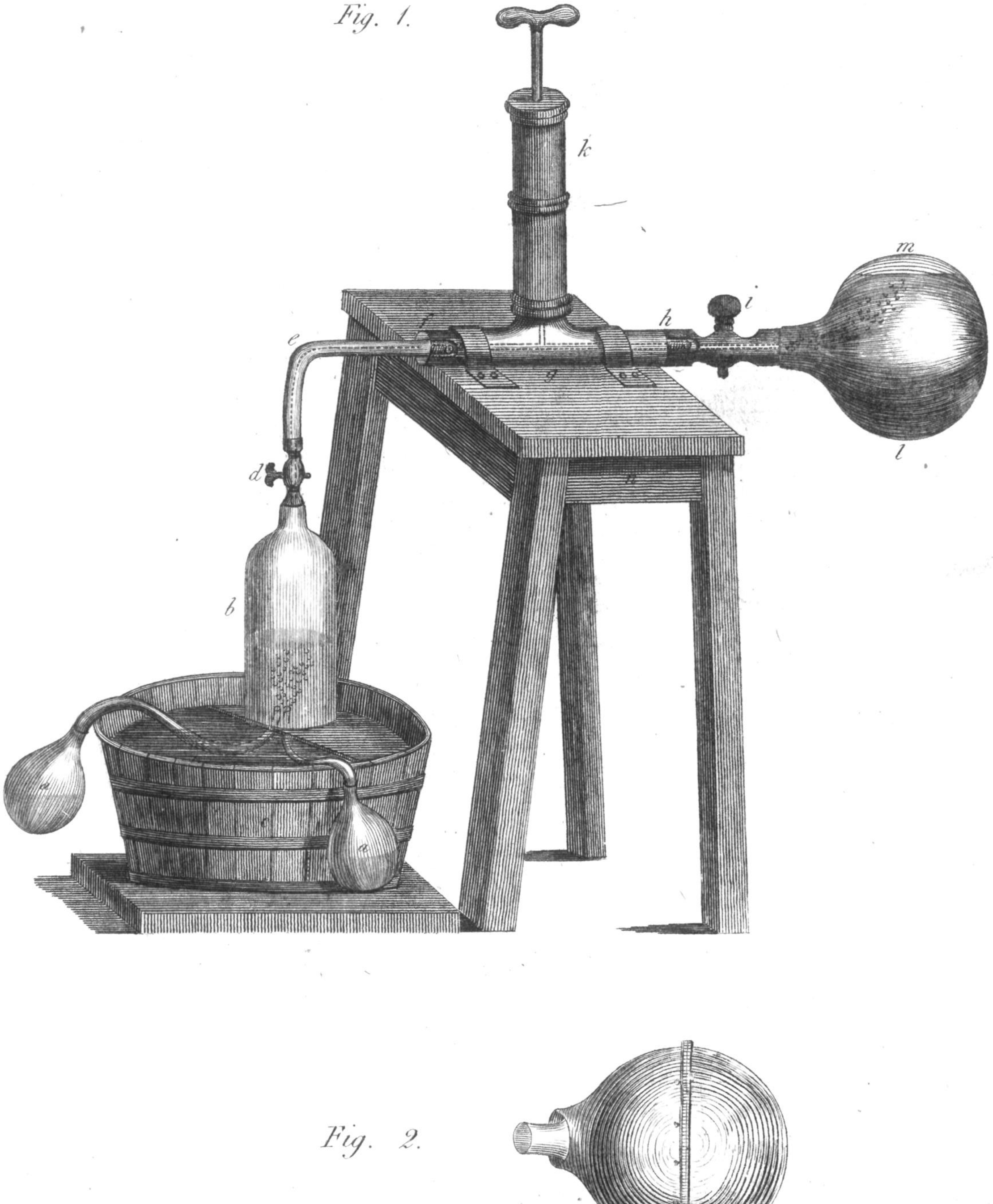
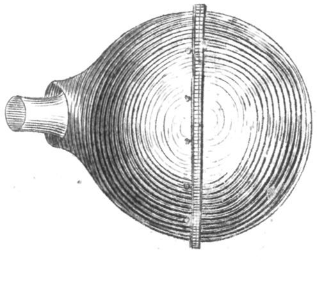


Fig. 2.



DESCRIPTION *of an* APPARATUS *for* IMPREGNATING WATER *and other* SUBSTANCES *ſtrongly with* CARBONIC ACID GAS. *By the Rev.* GILBERT AUSTIN, *M. R. I. A.*

Read Nov. 16th, 1799.

THE carbonic acid gas, or other gas, is generated in phials *(a, a)* with bent tubes in the uſual manner, and received in the jar *(b)* placed on the ſhelf of the pneumatic tub. When the jar *(b)* is filled, the phials are applied to others, which are filled alſo, and reſerved to repleniſh the jar *(b)*. To this jar it may be convenient to fit the ſtop cock *(d)* communicating with the bent tube *(e)*, or the bent tube *(e)* may be uſed without the ſtop cock, and be fitted immediately into the neck of the jar. At the end *(f)* of the bent tube is a valve opening into the tube *(g)*, and at the oppoſite end of the tube *(g)* is another valve *(h)* opening into the ſtop cock *(i)*, which communicates with the ſtrong glaſs veſſel *(l, m)*. To the tube *(g)* is adapted the condenſing ſyringe *(k)*, which is placed between the valves *(f* and *h)*. The tube *(g)* is firmly fixed to the ſtand *(n)*, ſo that the condenſing ſyringe may be worked without diſturbing the apparatus: all the joints muſt be well fitted and perfectly air-tight.

The uſe of this apparatus muſt be obvious. The parts are all to be ſcrewed together as in the figure except the ſtrong glaſs veſſel and its ſtop cock; the phials are alſo to be removed. The jar *(b)* being placed on the ſhelf of the pneumatic tub will, in theſe circumſtances, contain a portion of the common air of the apartment. In order to remove this, the piſton of the condenſer is to be raiſed; upon which the valve at *(h)* will cloſe, and that at *(f)* will open and admit into the vacuum formed in the barrel a portion of the common air contained under the jar, and the water will riſe in the jar in proportion to the capacity of the barrel of the condenſer. On thruſting down the piſton the valve *(f)* cloſes, and the air is expelled through the valve *(h)*, This operation is repeated till all the common air is removed from the jar *(b)*, and the water completely fills it. The ſtrong glaſs veſſel *(l, m)* with its ſtop cock is now ſcrewed on. It is nearly filled with the water to be impregnated, but not quite, a ſmall portion *(m)* of air being left in order to allow room for the agitation of the water. The jar *(b)* is now to be filled with carbonic acid gas, which is pumped up and forced into the glaſs veſſel in as large a quantity as it will admit without danger of burſting, which in my veſſel containing about a pint meaſure is about an equal bulk of gas The glaſs veſſel is then to be taken off (its ſtop cock being previouſly cloſed) and agitated briſkly; and as the water abſorbs the gas more readily when many of its particles are thus forced into contact

contact with it, the condenſation may be repeated ſeveral times. It appears uſeful in order to expel the bubble of common air left in the veſſel for the convenience of agitation, after two or three condenſations to open the ſtop cock and ſuffer it to be expelled, and then to renew the charge of the carbonic acid gas. In a very few minutes water may thus be acidulated to any degree (provided the apparatus is ſufficiently ſtrong and cloſe) ſo as even to foam out of the glaſs veſſel like liquors highly in bottle as ſoon as the ſtop cock is opened.

As the carbonic acid gas may be quickly generated or preſerved for any time in bottles cloſely ſtopped, artificial mineral waters in great perfection may by this apparatus be prepared as ſoon as any other medical preſcription.

The apparatus I have conſtructed is of braſs, and however carefully cleaned perceivably imparts a taſte of the metal to the water. It is adviſeable therefore to make it of ſome metal which either may not poſſibly impart any ſenſible taſte to the water, or which may not be conſidered injurious even if diſſolved in it in very ſmall portions; ſilver or tin appear beſt adapted for this purpoſe, but as the former may be too expenſive for general uſe, and as the latter is too ſoft to bear well the frequent ſcrewing and unſcrewing neceſſary in the uſe of the apparatus, the channels through which the gas paſſes may be well coated with ſilver or tin, which may anſwer the purpoſe; the pipes, and cocks may have a thick ſilver wire ſoldered in the centre which may be perforated, and the condenſer may be well plated or tinned on the inſide.

But as glaſs appears to be the moſt unexceptionable material, I have ordered an apparatus to be conſtructed entirely of glaſs, and have hopes that I ſhall have it ſo executed as not to admit any thing elſe to come in contact with the gas. As the difficulty of execution may however cauſe a variation in my plan, I ſhall defer the laying it before the Academy till I get it accompliſhed to my wiſh. Ingenious workmen may alſo be induced to contrive and execute ſome apparatus which may anſwer the purpoſe, ſhould my ideas ſeem practicable to them or uſeful for philoſophic experiments.

As diſagreeable accidents might ariſe from the burſting of the glaſs veſſel, an ingenious mechanical friend has ſuggeſted to me the propriety of encloſing it in a ſtrong copper caſe. It may conſiſt of two hemiſpheres with a broad rim ſcrewed together as in figure 2.